

MOLD FOR OPTIMIZING COOLING TIME TO FORM MOLDED ARTICLE

Abstract of the Disclosure

Mold cycle time is accelerated by employing thermally insulating surface temperature boosters, which are of a minimum thickness to promote cooling by heat transfer through the boosters. According to the thermal transfer properties of the insulating boosters and the respective temperatures of the molten material and the dies, the temperature of the cavity surface is raised by contact with the molten material to equal or exceed the temperature required to produce a molded article, preferably just until the time that the mold is fully filled. Heat transfer through the boosters to the dies then cools and solidifies the molded article until it can be removed from the mold. The temperature boosters result in increased cavity surface temperatures, such that the mold dies can be kept at substantially lower temperatures. The overall result is a reduction in mold cooling time and therefore acceleration of mold cycling. When the molded article is an optical disc, where the digital information is transferred to at least a part of a surface of the optical disc from a stamper that forms at least a part of the cavity surfaces, a stamper heating means can be used to improve the quality of optical performance. Typically, the stamper may contact high thermal conductivity materials at or beyond the outside diameter of the mold cavity, creating a path for the heat to flow from and cool the outer edge of the optical disc excessively. Transfer of the pits from the stamper is more difficult in the cooler material at the outer edge of the disc, reducing pit quality, and stresses are also created at the outer edge of the disc which cause birefringence, resulting in reduced optical performance. The stamper heating means increases the temperature of the stamper at the area of contact enough to reduce, stop, or even reverse the direction of the heat flow.